

Claims

- [c1] 1. A wireless receiver comprising:
- a PreCE module comprising a first bandwidth filter, an input for receiving a channel complex gain, and an output for outputting an estimation of the channel;
 - a Velocity Estimation (VE) module having an input electrically connected to the output of the PreCE module for receiving the output of the PreCE module; and
 - a PostCE module comprising a second bandwidth filter, a first input electrically connected to the output of the PreCE module for receiving the output of the PreCE module, and a second input connected to the output of the VE module;
- wherein the PostCE module substantially compensates for a Doppler induced frequency spread according to the output of the VE module before the output of the PreCE module is processed by the PostCE module so that the second bandwidth filter is narrower than the first bandwidth filter.
- [c2] 2. The wireless receiver of claim 1 further comprising:
- an Automatic Frequency Control (AFC) module having an input connected to the output of the PreCE module; and

a first mixer having a first input connected to the output of the PreCE module and a second input connected to an output of the AFC module;

wherein the first mixer mixes the output of the AFC module with the output of the PreCE module before the output of the PreCE module is received by the VE module and the PostCE module.

[c3] 3. The wireless receiver of claim 2 further comprising:
a Maximum Ratio Combining (MRC) module having a first input connected to the output of the PostCE module and a second input; and
a second mixer having a first input connected to an output of the MRC module and a second input connected to the output of the AFC module;
wherein the second mixer outputs a signal compensated for a frequency offset resulting from variations in local oscillators.

[c4] 4. The wireless receiver of claim 3 further comprising:
a Delay Estimation (DE) module having an input for receiving the channel complex gain; and
a Rake Fingers module having a first input for receiving the channel complex gain, a second input connected to an output of the DE module, and an output connected to the second input of the MRC module.

[c5] 5. A wireless receiver comprising:
a PreCE module having an input for receiving a channel complex gain and an output;
an Automatic Frequency Control (AFC) module having an input connected to the output of the PreCE module;
a first mixer having a first input connected to the output of the PreCE module and a second input connected to an output of the AFC module;
a Velocity Estimation (VE) module having an input connected to an output of the first mixer;
a PostCE module having a first input connected to the output of the first mixer and a second input connected to an output of the VE module;
a Maximum Ratio Combining (MRC) module having a first input connected to an output of the PostCE module; and
a second mixer having a first input connected to an output of the MRC and a second input connected to the output of the AFC module.

[c6] 6. The wireless receiver of claim 5 further comprising:
a Delay Estimation (DE) module having an input for receiving the channel complex gain; and
a Rake Fingers module having a first input for receiving the channel complex gain, a second input connected to an output of the DE module, and an output connected to a second input of the MRC module.

[c7] 7. A method for signal demodulation in a wireless receiver, the receiver comprising a Velocity Estimation (VE) module, the method comprising:
generating an estimation of a channel complex gain signal with a PreCE module comprising a first bandwidth filter;
generating an estimate of velocity of the wireless receiver relative to a base station utilizing the VE module;
substantially compensating the estimation of the channel complex gain for a Doppler frequency spread according to an output of the VE module; and
compensating phase differences in the substantially compensated estimation of the channel complex gain with a PostCE module comprising a second bandwidth filter;
wherein the second bandwidth filter is narrower than the first bandwidth filter.

[c8] 8. The method of claim 7 wherein the wireless receiver further comprises:
a Delay Estimation (DE) module having an input for receiving the channel complex gain signal;
a Rake Fingers module having a first input for receiving the channel complex gain signal and a second input connected to the output of the DE module; and
a Maximum Ratio Combining (MRC) module having a first

input connected to an output of the Rake Fingers module, a second input connected to an output of the PostCE module, and an output for outputting a processed signal.

- [c9] 9. The method of claim 8 further comprising:
generating a frequency offset compensation signal utilizing an Automatic Frequency Control (AFC) module according to the estimation of the channel complex gain;
and
mixing the frequency offset compensation signal with the processed signal to compensate for a frequency offset resulting from variations in local oscillators.